PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of :
Richard A. Lodge et al.

Serial No: 09/489,929

Filed: January 24, 2000

Group Art Unit: 2684

Examiner: TRAN, Pablo N.

For: Packet Data Traffic Control for Cellular Wireless Networks

17/Ext
Brief
1-6-04

Assistant Commissioner for Patents
Alexandria, VA 22313-1450

MAIL STOP APPEAL BRIEF -PATENTS

Sir:

APPELLANT'S BRIEF UNDER 37 C.F.R. § 1.192

Pursuant to 37 C.F.R. § 1.191, the Applicant submitted a Notice of Appeal from the Examiner to the Board of Patent Appeals and Interferences on October 22, 2003. Specifically, the Applicant takes appeal from the Examiner's rejection of claims 1-18, 21-38 and 41-52 under 35 U.S.C. § 103(a). The Notice of Appeal was filed in response to the Examiner's Final Action (paper No. 13) mailed August 22, 2003. Pursuant to 37 C.F.R. § 1.192, the Applicant now submits the following brief.

1) Real Party in Interest

The real party of interest is Nortel Networks Limited, by virtue of an assignment executed by the inventors in favor of Nortel Networks Corporation recorded at Reel/Frame 010586/0143, and a Universal Change of Name from Nortel Networks Corporation to Nortel Networks Limited recorded at Reel 011195/Frame 0706.

2) Related Appeals and Interferences

None.

3) Status of claims

Pursuant to the Final Action (paper No. 13) mailed August 22, 2003 and the Advisory Action (Paper No. 16) mailed November 19, 2003, the status of the claims is as follows:

(a) claims 1-18, 21-38 and 41-52 stand rejected under 35 U.S.C. § 103(a), as being unpatentable over the teaching of United States Patent No. 5,535,429 (Bergenlid et al.) in view of United States Patent No. 5,507,006 (Knight); and

(b) claims 19-20, 39-40 and 53-54 are objected to as being dependent on a rejected base claim.

4) Status of Amendments

No amendments were submitted in the Applicant's response filed October 22, 2003, to the Final Office Action (Paper No. 13) mailed on August 22, 2003. Accordingly, the claims remain as amended in the Applicant's response filed on May 23, 2003. A copy of the current claims is provided in the Appendix below.

5) Summary of Invention

The present invention is directed to methods and systems for controlling packet data traffic in a wireless packet-switched network, so as to increase the overall throughput of the packet data traffic through the network. As defined in claim 1, data traffic within a wireless data communications system is controlled by: examining performance of each wireless link to identify a poorly performing wireless link; and temporarily interrupting bi-directional data transmission over the poorly performing wireless link. Thus, as described in detail at page 10, lines 5-31 of the originally filed specification:

> "In accordance with the present invention, data transmitted over poorly performing wireless links is intentionally dropped or suspended in order to improve the overall throughput of the wireless (packet-switched) network. A packet transmission control algorithm is provided to identify and drop (or suspend) wireless links based on, for example, two preferred criteria: a quality of service (QOS) requirement violation, and an interference level on the link.

> In the case of a QOS requirement violation, if a transmitted packet or frame has already violated the applicable QOS requirement, then it can be dropped. Alternatively, if it is predicted that the frame (or packet) is very likely to violate the QOS requirement, it can be preemptively dropped.
>
> In the case of an interference level on the link, where the QOS is not a factor, the transmission of a frame or packet can be suspended if the current wireless link is determined to be of such poor quality that the predicted data throughput is below a predetermined threshold.
>
> The intentional interruption of data communication on poorly performing links frees band-width for use by other links, and also reduces the interference in the system. Both of these effects result in increased overall data throughput of the network by increasing the performance of the remaining links, and these effects are cumulative." (Underlining added)

An important aspect of the present invention is that the suspension of data transmission through poorly performing link(s) is accomplished without severing or disconnecting the link itself. The distinction between suspension of packet data transmission (or, equivalently, dropping of a frame) and disconnection of a link (or, equivalently, dropping of a call) is clearly described at page 11, lines -21 of the originally filed specification. Thus:

> "The concept of dropping a call in a circuit-switched network is very different from that of dropping or suspending a packet or frame transmission in a packet-switched network. In the circuit-switched network, dropping a call implies that the link connection between the originating and terminating users is severed, whereas this is not necessarily true in the case of a dropped frame or packet in a packet-switched network. The dropping of a call in cellular wireless circuit-switched networks usually occurs in the radio link between the serving base station and the mobile user due to a harsh radio frequency (RF) environment. When designing such a system, one of the principal objectives is to minimize the number of dropped calls, which significantly affect the grade of service (GOS) offered to the users by the network provider. In wireless packet-switched network systems, however,

the dropping or suspension of a radio link transmission does not automatically result in a breakdown of the connection between a server and a user. The parties to the communications session can still be connected via known logical set up links." (Underlining added)

6) Issues

The following issues presented for review by the Board of Patent Appeals and Interferences are as follows:

(a) Whether the Examiner has properly established *prima facie* obviousness of claims 1-18, 21-38 and 41-52 in light of the teaching of United States Patent No. 5,535,429 (Bergenlid et al.) in view of United States Patent No. 5,507,006 (Knight), as required by 35 U.S.C. § 103(a) and MPEP. § 703.02(j); and

(b) Whether the Examiner has relied upon improper hind-sight reconstruction as the basis of his rejection of claims under 35 U.S.C. § 103(a);

(c) Whether the Applicant has successfully rebutted the Examiner's allegations of obviousness of claims 1-18, 21-38 and 41-52 in light of the teaching of United States Patent No. 5,535,429 (Bergenlid et al.) in view of United States Patent No. 5,507,006 (Knight); and

(d) Whether at least claims 1, 21 and 41 are patentable over the references cited by the Examiner.

7) Grouping of Claims

Pending claims 1-54 are believed to define a single patentable invention, and will stand or fall together. Of these, claims 1, 21 and 41 are independent claims. All of the issues presented for review can be decided with reference to independent claim 1.

8) Argument

In order to facilitate review by the Board, the Applicant's arguments are presented in the following order:

- The Examiner's rejection of claims 1-18, 21-38 and 41-52 under 35 U.S.C. § 103(a)

- Brief description of the cited references
- Has the Examiner established *prima facie* obviousness
- Has the Examiner relied upon Improper Hindsight Reasoning
- Has the Applicant successfully rebutted the Examiner's allegations
- Are at least claims 1, 21 and 41 patentable over the Examiner's combination of references

Arguments pertaining to each of these points are presented below under equivalent sub-headings.

(i) The Examiner's rejection of claims 1-18, 21-38 and 41-52 under 35 U.S.C. § 103(a)

In the Final Office Action (Paper No. 13) mailed on August 22, 2003, the Examiner asserted (at paragraph 4 of the Examiner's detailed action) that:

> "As per claims 1, 21 and 41, Bergenlid et al disclosed a base station (FIG. 1/item BS) being adapted for bi-directional data communications with one or more wireless terminals (FIG. 1/item MS1—MSn) over a respective bidirectional wireless data communication links wherein the base station identify a poorly performing link and interrupting data transmission over the poorly performing wireless link (abstract, col.2/ln. 29-36. col. 4/ln.31-56)
>
> Bergenlid et al. do not specifically disclosed the communication link is temporary interrupting. Knight disclosed such method of temporary ceased radio channel. (see abstract, col. 2/ln. 20-24, col. 3/ln.56-col. 4/ln 2). Since Bergenlid et al. and Knight both teach channel allocation for the mobile communication system, it would have been obvious to one of ordinary skill in the art to provide such method of temporary interrupting communication link, as disclosed in Knight, to the communication system of Bergenlid et al in order to efficiently allocate channel and alleviated disruption of communication link."

The garbled grammar of these paragraphs renders the Examiner's argument virtually unintelligible. However, as best understood by the Applicant, the Examiner appears to be asserting that Knight teaches the temporary interruption of data transmission, and that it would be obvious to combine this teaching with that of Bergenlid et al to yield the features of the present invention defined in claims 1, 21 and 41. As best understood by the Applicant, the Examiner appears to further assert that motivation for such a combination is found in that "Bergenlid et al. and Knight both teach channel allocation for the mobile communication system" and the Examiner's proposed combination would somehow enable the system to "efficiently allocate channel and alleviated disruption of communication link".

Applicant has carefully searched both of the Bergenlid et al. and Knight references, and has not found any reference whatsoever to "channel allocation" in either Bergenlid et al. or Knight. Even if this deficiency in the Examiner's reasoning is overlooked, the purported object of the Examiner's combination ("efficiently allocate channel and alleviated disruption of communication link") is irrelevant to the present invention. As discussed above, the present invention improves overall data throughput of the network by interrupting data communication on poorly performing links. This reduces interference in the system, and thereby improves the performance of the remaining links. The present invention is not concerned with "channel allocation", and does not attempt to alleviate disruption of a poorly performing link. Thus the Applicant cannot identify any clear relationship between the Examiner's reasoning and the present invention.

In the Advisory Action (Paper 16) mailed November 19, 2003, the Examiner asserted that the Applicant's response filed October 22, 2003 did not place the application into condition for allowance. In support of this position, the Examiner appeared to reaffirm his arguments in the Final Action by arguing that:

> "Applicant stated that 'Bergenlid disclosed the forced termination of communication connection is permanent'. In response to the Applicant, the communication connection, as taught by Bergenlid is not permanent (col.2/ln29-36). Applicant stated that the rejection of Bergenlid in view of Knight is improper. Bergenlid do not explicitly disclosed a temporary interrupting bi-directional data transmission. However, Knight taught such

> method (abstract, col. 2/ln16-27). Therefore it would have been obvious to one of ordinary skill in the art to provide such method as taught by knight to the communication system of Bergenlid to effectively allocated communication channels resources".

While the Examiner utilizes quotation marks around the statement 'Bergenlid disclosed the forced termination of communication connection is permanent', Applicant notes that this passage does not appear anywhere in Applicant's response filed October 22, 2003.

Continuing with the Examiner's rejections in paragraph 4 of the Examiner's detailed action:

> As per claims 2, 22 and 41, Bergenlid et al disclosed monitoring one of more performance parameters related to each wireless link and comparing each monitoring performance parameters to a respective predetermined threshold (col. 8/ln.5-15, col 8/ln.42-64)
>
> As per claims 3-4, 13, 23-24, 33, 43-44, Bergenlid et al disclosed the performance parameters related to each wireless link are based on interference on the wireless link and comprises any one or more of a S/N ratio, and user data throughput rate, a C/I ratio, a BER ratio, or a number of suspended frames (col 5.ln.39-67)
>
> As per claims 5, 25, and 45, Bergenlid et al do not explicitly disclosed an average, taken over a number of successive burst ... However, such is notoriously well known in the art.
>
> As per claims 6, 14, 26, 34, 46 and 50, Bergenlid disclosed suspending transmission of a data frame over the poorly performing wireless link (col 7/ln. 48-col.8/ln.64)
>
> As per claims 7 and 27, Bergenlid et al disclosed resuming transmission of the data frame after a delay period (abstract, col. 2/ln. 29-36)

As per claims 8, 16, 28, 36, Bergenlid et al disclosed the delay period is of random length (col.2/ln. 29-36. col. 7/ln. 48-col.8/ln.64).

As per claims 9, 17, 29, 37 ,47 and 51, Bergenlid et al disclosed maintaining a count of dropped frames (col 7/ln 48-col.8/ln. 64).

As per claims 10, 18, 30, 38, 48, and 52, Bergenlid et al disclosed suspending transmission if the count of suspended frames exceeds a predetermined threshold (col 7/ln 48-col.8/ln. 64).

As per claims 15 and 35, Bergenlid et al disclosed retransmitting the supended frame after a delay period (col 7/ln 48-col.8/ln. 64).

As per claims 11 and 31, Bergenlid et al disclosed restarting the transmission after a delay period (col 7/ln 48-col.8/ln. 64).

As per claims 12 and 32, Bergenlid et al disclosed the delay is of random length (col 7/ln 48-col.8/ln. 64).

(ii) Brief description of the cited references

United States Patent No. 5,535,429 (Bergenlid et al.) teaches:

"A method of forcibly disconnecting a communications connection established between a mobile station and a mobile services switching network, depending on whether the communications connection initially allocated to the mobile station has deteriorated or that a call connection or a handover attempt has failed." (abstract, first sentence, underlining added)

The primary object of the present invention is to provide a method for disconnecting effectively a communications connection that has been established between a mobile station and a mobile radio network when, for some reason, communication becomes impaired, thus making it necessary to use another radio resource, and so that the current connection can be released, for instance so that the communications channel can be used by another mobile station.(col. 2/ln. 29-36, underlining added)

> "FIG. 3 is a signalling diagram (arrow diagram) which illustrates one embodiment of the present invention for forced disconnection of an established connection. It is assumed that a mobile station MS1 has a connection established with the base station BS over a given traffic channel TCHk, and that the mobile station has moved with the result that this traffic channel has been impaired." (col. 4/ln. 34-40, underlining added)

Thus, Bergenlid et al clearly and unambiguously teach the "forced disconnection" of the impaired connection "so that the current connection can be released" and "the communications channel can be used by another mobile station". It is self evident that such a forced disconnection necessarily involves the permanent termination of data transmission through the involved communications connection.

For greater certainty, it is well known in the art that a "communications channel" and a "communications connection" are by no means equivalent. A "communications channel" is commonly understood to refer to a transmission path (e.g., a carrier frequency; a time slot in TDMA systems; and/or a spreading code in CDMA systems) through which data can be transmitted. In contrast, a "communications connection" is a link established between a pair of wireless devices (i.e. a base station and a mobile station) by allocating and managing a communications channel to convey data traffic between the involved devices. In this sense, the "communications connections" of Bergenlid et al. are synonymous with the "wireless links" of the present invention. It is self evident that when a "communications connection" is disconnected, the channel is released and can be used for some other purpose, as taught explicitly by Bergenlid et al (see, for example, col. 2/ln. 29-36, quoted above). At that point, however, the original (and now disconnected) connection ceases to exist, and all data transmission through that connection is permanently terminated. Further communication between the previously connected wireless devices can only become possible after a new communications connection (wireless link) has been established.

In summary, Bergenlid et al clearly and unambiguously teach that a poorly performing communications connection is "forcibly disconnected". As a result of such "forced disconnection" of the impaired connection, "the current connection can be released" and "the communications channel can be used by another mobile station". It is self evident that such a

forced disconnection necessarily involves the permanent termination of data transmission through the involved communications connection. Further communication between the Base station and the mobile station affected by the "forcibly disconnected" connection must necessarily require the establishment of a new connection.

United States Patent No. 5,507,006 (Knight), is directed to a method of improving the quality of voice or data communication, as perceived by a user, by timing the transmission of control signaling to coincide with naturally occurring silent periods in normal speech. Thus:

> "Referring to FIG. 2, in a telephone conversation, speech occurs in bursts, with short periods of silence between them. The general principle of the preferred embodiment [is] to inject signalling between the base and mobile stations into the periods between bursts of speech in a call. In this way, the signalling has a reduced effect on the perceived quality of a call." (col. 3/ln4-10, underlining added)

The fact that normal speech (and for that matter, data communications) "occurs in bursts, with short periods of silence between them" was very well known long before the Knight patent. The invention of Knight is based on the realization that the "periods of silence" between bursts of communication can be used for control signaling. The advantage of this approach is that a user does not perceive a reduction in call quality due to control signalling timed to coincide with naturally occurring silent periods. Thus Knight clearly and unambiguously teaches that the base station detects naturally occurring silent periods in speech or data communication, and then injects control signalling into the detected silent periods, in order to avoid disruptions that may be perceived by the user. Thus:

> "According to a further aspect the invention provides, a method of signalling in a cellular radio system comprising: ... determining that voice or data communication between the base station and the mobile station has temporarily ceased; and initiating required signalling with the mobile station during a determined temporary cessation in the voice or data communication ..." (col. 2/lns 16-24)

And:

> "The present invention seeks to provide a cellular radio system in which the disruption caused by signalling is alleviated." (col 1, lns 37-39)

In direct contradiction to the Examiner's repeated assertions, Knight does not teach or suggest deliberately causing temporary interruptions in data transmission, nor any advantages obtained thereby. Indeed, Knight teaches directly away from the Examiner's interpretation, by asserting that any interruptions in data transmission are undesirable, and teaching an invention that alleviates any such interruptions.

(iii) Has the Examiner established *prima facie* obviousness

MPEP. § 703.02(j) sets out three criteria that must be met by the Examiner in order to establish a *prima facie* case of obviousness.

> "First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings."

> "Second, there must be a reasonable expectation of success."

> "Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations."

Additionally, "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)."

It is submitted that that the Examiner has not met ANY of these criteria, and thus has not established *prima facie* obviousness of any of claims 1, 21 or 41.

With reference to the first criterion, there is no suggestion or motivation, in either Bergenlid et al or Knight themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the Bergenlid et al reference using the teaching of Knight or to otherwise combine the teachings of Bergenlid et al and Knight in the manner suggested by the Examiner.

After extensive reviews of both references, Applicant has been able to discover exactly one point of concordance between the Bergenlid et al and Knight references; namely, they both relate to wireless communications networks. However, within the context of wireless networks Bergenlid et al and Knight are directed to radically different problems, and propose entirely different solutions. As discussed above, Bergenlid et al detects a poorly performing link, and "forcibly disconnects" it. Knight attempts to improve the perceived quality of communications by timing control channel signaling so that it will not interfere with bursts of speech.

Applicant has searched both references carefully, and has found absolutely no teaching, suggestion or motivation, in either document, for modifying Bergenlid et al to temporarily interrupt data transmission, rather than forcibly disconnect a poorly performing link, as suggested by the Examiner. With respect to the "knowledge generally available to one of ordinary skill in the art" it is simply implausible to suggest that a teaching of inserting control signalling into naturally occurring silent periods between bursts of speech, as provide by Knight, would lead a person of ordinary skill in the art to deliberately interrupt data transmission through a poorly performing link as a means of improving overall data throughput of the network, as provided by the present invention.

With reference to the second criterion, it is submitted that there is no reasonable expectation that the reference teachings can be successfully combined in the manner suggested by the Examiner. As discussed above, Knight explicitly states that even brief interruptions in voice or data transmission can be perceived by a user as a deterioration of call quality, and sets out to overcome this deficiency (col 1, lns 20-25, and col 1, lns 37-39). The solution of Knight is to detect naturally occurring periods of silence, and inject the required control signaling into those silent periods. This clearly and unambiguously contradicts the Examiner's allegation that Knight teaches temporary interruption of data transmission. Furthermore, the teaching of Knight does not provide any basis for a reasonable expectation that deliberate interruption of data transmission over a poorly performing link can be used to successfully improve overall network performance, as provided by the present invention.

With reference to the third criterion, it is submitted that the cited references, taken alone or in combination, do not teach or suggest all of the limitations of claims 1, 21 and 41. As discussed above, Bergenlid et al clearly and unambiguously teach that a poorly performing

communications connection is "forcibly disconnected". In so doing, Bergenlid et al teach directly away from the present invention, in which data transmission is only temporarily interrupted. Knight does not supply the missing teaching. As discussed above, Knight teaches that control signaling can be injected into naturally occurring silent periods in normal speech so as to avoid interruptions (and thus perceived degradation of call quality) due to the control signaling. Combining the teachings of Bergenlid et al and Knight can only yield a cellular communications system in which, during a normal communications session, the base station optimizes the perceived quality of communications by detecting naturally occurring silent periods, and injecting control signaling into these periods of silence, as taught by Knight. In the event that a communications link (connection) is found to be faulty, then the impaired connection is "forcibly disconnected" as provided by Bergenlid et al. This functionality clearly fails to meet the limitations of claims 1, 21 and 41, which require the temporary interruption of data transmission over the poorly performing link.

Finally, it is well established that:

> "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

It is submitted that the Examiner has not even attempted to meet this requirement. In particular, while the Examiner has asserted that it would be obvious to combine Bergenlid et al. with Knight, the Examiner has not attempted to show any relationship between his purported combination and the present invention. As mentioned above, the Examiner has asserted that his combination enables the system to "efficiently allocate channel and alleviated disruption of communication link" and (in the Advisory Action) enables " effectively allocated communication channels resources". However, neither of these objects is relevant to the present invention. As discussed above, the present invention improves overall data throughput of the network by interrupting data communication on poorly performing links. This reduces interference in the system, and thereby improves the performance of the remaining links. The present invention is

not concerned with "channel allocation", and does not attempt to alleviate disruption of a poorly performing link. Thus the Examiner has not attempted to present any line of reasoning (convincing or otherwise) as to how the present invention, as defined in claims 1, 21 and 41 is rendered obvious by his combination of references.

With respect to claims 2, 22 and 41, Bergenlid et al teach forced disconnection of a wireless connection. The passages cited by the Examiner describe embodiments in which the condition for triggering forced disconnection is a time-out condition between synchronizing bursts. It is possible that other performance parameters may be used to determine the state of a communications connection, but not such alternate performance parameters are disclosed in the Bergenlid et al reference.

With respect to 3-4, 13, 23-24, 33, 43-44, the passage cited by the Examiner (col 5.ln.39-67 of Bergenlid et al.) does not mention ANY of the performance parameters defined in this claim. Nor does Bergenlid et al teach or suggest the use of any of the claimed performance parameters for detecting a poorly performing link.

With respect to claims 6, 14, 26, 34, 46 and 50, the Examiner's assertion is totally unsupported by any portion of the teaching of Bergenlid et al. In particular, the passage cited by the Examiner (col 7/ln. 48-col.8/ln.64) Bergenlid et al clearly described an embodiment in which a pair of counters are used to measure a time elapsed between successive synchronizing bursts. When a time-out condition is detected, the communications connection is relinquished (i.e. forcibly disconnected). In respect of data frames, (presumably the TDMA frames discussed at col 3, ln 62-col. 4, ln.30, which is the only reference to frames in the entire document) forced disconnection of the communications connection necessarily implies that the frame is dropped entirely, not merely suspended.

With respect to claims 7 and 27, the Examiner's assertion is totally unsupported by any portion of the teaching of Bergenlid et al. As discussed at length above, Bergenlid et al clearly and unambiguously teach the "forced disconnection" of the impaired connection "so that the current connection can be released" and "the communications channel can be used by another mobile station". It is self evident that such a forced disconnection necessarily involves the permanent termination of data transmission through the involved communications connection. For the Examiner to assert that "Bergenlid et al. "disclosed resuming transmission of the data

frame after a delay period" not only is unsupported by Bergenlid et al. but also to explicitly contradicts the Examiner's own reasoning in his rejection of claims 1, 21, and 41 - to-wit: "Bergenlid et al. do not specifically disclosed the communication link is temporary interrupting "

With respect to claims 8, 16, 28, 36, the Examiner's assertion is totally unsupported by any portion of the teaching of Bergenlid et al. As discussed at length above, Bergenlid et al clearly and unambiguously teach the "forced disconnection" of the impaired connection "so that the current connection can be released" and "the communications channel can be used by another mobile station". It is self evident that such a forced disconnection necessarily involves the permanent termination of data transmission through the involved communications connection, and the dropping of any frames associated with it. It is technically implausible to suggest that, after the "forced disconnection" of an impaired connection, transmission of data frames associated with that connection might somehow be resumed. Any notion of resuming transmission of suspended data frames is gleaned solely and exclusively from the applicant's own disclosure. No analogous teaching can be found in the Bergenlid et al patent.

With respect to claims 9, 17, 29, 37 ,47 and 51, the Examiner's assertion is unsupported by the teaching of Bergenlid et al. As discussed at length above, Bergenlid et al clearly and unambiguously teach the "forced disconnection" of the impaired connection "so that the current connection can be released" and "the communications channel can be used by another mobile station". It is self evident that such a forced disconnection necessarily involves the permanent termination of data transmission through the involved communications connection, and the dropping of any frames associated with it. It is technically implausible to suggest that, after the "forced disconnection" of an impaired connection, dropped data frames associated with that connection might be counted, and any such notion is entirely foreign to the teaching of Bergenlid et al. Any notion of using a count of dropped frames to determine whether or not data transmission over a wireless link should be suspended is gleaned solely and exclusively from the applicant's own disclosure. No analogous teaching can be found in the Bergenlid et al patent.

With respect to claims 10, 18, 30, 38, 48, and 52, the Examiner's assertion is unsupported by the teaching of Bergenlid et al. As discussed at length above, Bergenlid et al clearly and unambiguously teach the "forced disconnection" of the impaired connection "so that the current connection can be released" and "the communications channel can be used by another mobile

station". Bergenlid et al do not teach, suggest, or even remotely contemplate "suspending transmission" of data frames under any circumstances. Any notion of suspending transmission if the count of suspended frames exceeds a predetermined threshold is gleaned solely and exclusively from the applicant's own disclosure. No analogous teaching can be found in the Bergenlid et al patent.

With respect to claims 15 and 35, the Examiner's assertion is totally unsupported by any portion of the teaching of Bergenlid et al. As discussed at length above, Bergenlid et al clearly and unambiguously teach the "forced disconnection" of the impaired connection "so that the current connection can be released" and "the communications channel can be used by another mobile station". It is self evident that such a forced disconnection necessarily involves the permanent termination of data transmission through the involved communications connection, and the dropping of any frames associated with it. It is technically implausible to suggest that, after the "forced disconnection" of an impaired connection, suspended (actually, dropped) data frames associated with that connection might somehow be retransmitted. Any notion of retransmitting suspended data frames is gleaned solely and exclusively from the applicant's own disclosure. No analogous teaching can be found in the Bergenlid et al patent.

With respect to claims 11 and 31, Bergenlid et al the Examiner's assertion is totally unsupported by any portion of the teaching of Bergenlid et al. As discussed at length above, Bergenlid et al clearly and unambiguously teach the "forced disconnection" of the impaired connection "so that the current connection can be released" and "the communications channel can be used by another mobile station". It is self evident that such a forced disconnection necessarily involves the permanent termination of data transmission through the involved communications connection, and the dropping of any frames associated with it. It is technically implausible to suggest that, after the "forced disconnection" of an impaired connection, transmission of data associated with that connection might somehow be restarted. Any notion of restarting transmission of suspended data frames is gleaned solely and exclusively from the applicant's own disclosure. No analogous teaching can be found in the Bergenlid et al patent.

With respect to claims 12 and 32, since Bergenlid et al do not teach, suggest, or even remotely contemplate restarting data transmission over a forcibly disconnected communications connection – under any circumstances whatsoever – it is implausible to suggest that any delay

associated with such restart may be of any length (random or otherwise). Any notion of restarting transmission of suspended data frames after a random delay period is gleaned solely and exclusively from the applicant's own disclosure. No analogous teaching can be found in the Bergenlid et al patent.

(iv) Has the Examiner relied upon Improper Hindsight Reasoning

It is well recognised that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). However, in the present case, it is submitted that the Examiner's rejection does not, in fact take into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, but rather is based upon knowledge gleaned exclusively and entirely from the applicant's disclosure. As such, it is submitted that the Examiner's rejection is based on improper hindsight reasoning.

In particular, as described in detail above, the only plausible combination of the teachings of Bergenlid et al. and Knight yields a cellular communications system in which, during a normal communications session, the base station detects naturally occurring silent periods in communication, and injects control signaling into these periods of silence, as taught by Knight. In the event that the communications link (connection) is found to be faulty, then the connection is "forcibly disconnected" as provided by Bergenlid et al.

As is also described in detail above, this functionality is not in any way similar to the presently claimed invention, in which overall data throughput of a network is improved by temporarily interrupting data transmission through poorly performing links.

In order to close the gap between the teachings of Bergenlid et al and Knight, and the present invention, it is necessary to imagine that a person of ordinary skill in the art would seize upon the well known fact that control signaling may interfere with data transmission, as described by Knight; springboard from this fact to recognize that data transmission could be interrupted for other reasons; discard Knight's teaching that interruptions are disadvantageous,

and realize that deliberate interruptions may be useful in certain circumstances; and then top it all off by recognising that doing so in response to detection of a poorly performing link – without actually disconnecting the link - can be used to enhance overall performance of the network. Furthermore, the Examiner's combination requires that one imagine that the person of ordinary skill in the art would be drawn to take all of these steps, prompted solely by Bergenlid's teaching of "forced disconnection" of impaired links and Knight's teaching of techniques for alleviating the effects of interruptions. Such a proposition strains credulity.

Knight explicitly states that interruptions in data transmission are undesirable, and teaches methods and systems for alleviating them. Bergenlid et al detects poorly performing links, and forcibly disconnects them. Neither Bergenlid et al. nor Knight teach, suggest or remotely contemplate that temporarily interrupting data transmission though a faulty connection is useful and/or desirable. Nor do either of these references teach, suggest or remotely contemplate any advantages that might be obtained thereby. Specifically, neither Bergenlid et al. nor Knight teach, suggest or remotely contemplate that temporarily interrupting data transmission though a faulty connection can be used to enhance overall data throughput of the network. In fact, neither Bergenlid et al. nor Knight even discuss how termination of data transmission over an impaired link affects performance of the network as a whole. Both references are completely silent on this subject. Such teaching can only be found in the applicant's own specification.

Specifically, teaching of deliberate temporary interruption of data transmission over a poorly performing link can only be found in the applicant's own specification. Motivation for taking this action, and advantages obtained thereby, can only be found in the applicant's own specification. Thus the Examiner has plainly relied upon information gleaned solely from the applicant's own disclosure, in order to select unrelated features of unrelated prior art references, and further to guide the combination of those features as the basis of his rejection. It is submitted that such reliance on the applicant's disclosure to fabricate a basis for rejection under 35 U.S.C. § 103(a) is improper.

(v) Has the Applicant successfully rebutted the Examiner's rejections

Even if the Examiner's combination of references is deemed to be proper, which is not admitted, it is believed that the Applicant has fully traversed the Examiner's rejection of claims 1, 21 and 41.

As discussed at some length above, the cited references, taken alone or in combination, do not teach or suggest all of the limitations of claims 1, 21 and 41. Bergenlid et al clearly and unambiguously teach that a poorly performing communications connection is "forcibly disconnected". In so doing, Bergenlid et al teach directly away from the present invention, in which data transmission is only temporarily interrupted.

Knight does not supply the missing teaching. As discussed above, Knight teaches that control signaling can be injected into naturally occurring silent periods between bursts of speech so as to avoid interruptions (and thus perceived degradation of call quality) due to the control signaling. In so doing, Knight directly contradicts the Examiner's allegations concerning this reference.

The only plausible combination of the teachings of Bergenlid et al and Knight yields a cellular communications system in which, during a normal communications session, the base station optimizes the perceived quality of communications by detecting naturally occurring silent periods, and injecting control signaling into these periods of silence, as taught by Knight. In the event that a communications link (connection) is found to be faulty, then the impaired connection is "forcibly disconnected" as provided by Bergenlid et al. This functionality clearly fails to meet the limitations of claims 1, 21 and 41, which require the temporary interruption of data transmission over the poorly performing link.

As discussed above, the Examiner's combination, which is not plausibly supported by teachings of Bergenlid et al and Knight, is purported by the Examiner to achieve advantages unrelated to the present invention.

Accordingly, it is believed that the Applicant has rebutted each and every ground of rejection raised by the Examiner.

(vi) Are at least claims 1, 21 and 41 patentable over the Examiner's combination of references

None of the known prior art, taken alone or in any combination, teaches or suggests the features of the present invention as defined in claims 1, 21 and 41. Thus the present invention as defined in independent claims 1, 21 and 41 is clearly distinguishable over the prior art of record, and is believed to be patentable. The dependent claims 2-20, 22-40 and 42-54 are believed to define further patentable subject matter.

9) Appendix

Claims involved in the Appeal

1. [AMENDED] A method of controlling data traffic in a wireless data communications network comprising a plurality of wireless terminals and a base station, each wireless terminal being adapted for bi-directional data communication with the base station through a respective bi-directional wireless data communications link, the method comprising steps of:

   a) examining performance of each wireless link to identify a poorly performing wireless link; and

   b) temporarily interrupting bi-directional data transmission over the poorly performing wireless link.

2. [AMENDED] A method as claimed in claim 1, wherein the step of examining performance of the wireless links comprises steps of monitoring one or more performance parameters related to each wireless link, and comparing each monitored performance parameter to a respective predetermined threshold value.

3. [ORIGINAL] A method as claimed in claim 2, wherein the one or more performance parameters related to each wireless link are based on any one or more of a quality-of-service (QOS), and interference on the wireless link.

4. [ORIGINAL] A method as claimed in claim 3, wherein at least one of the performance parameters related to each wireless link is based on interference on the wireless link, and comprises any one or more of: a signal-to-noise (S/N) ratio; a user data throughput rate; a

carrier-to-interference (C/I) ratio; a bit-error-rate (BER); and a number of suspended frames.

5. [ORIGINAL] A method as claimed in claim 4, wherein at least one of the performance parameters related to each wireless link comprises an average, taken over a number n of successive bursts, of any one or more of the S/N ratio; the C/I ratio; the user data throughput rate; and the BER.

6. [AMENDED] A method as claimed in claim 1, wherein the step of interrupting data transmission over the poorly performing wireless link comprises a step of suspending transmission of a data frame over the poorly performing wireless link.

7. [ORIGINAL] A method as claimed in claim 6, further comprising a step of resuming transmission of the data frame after a delay period.

8. [ORIGINAL] A method as claimed in claim 7, wherein the delay period is a period of random length.

9. [AMENDED] A method as claimed in claim 6, further comprising maintaining a count of suspended frames.

10. [ORIGINAL] A method as claimed in claim 9, further comprising suspending a communications session over the wireless link if the count of suspended frames exceeds a predetermined threshold.

11. [AMENDED] A method as claimed in claim 10, further comprising restarting the session after a delay period.

12. [AMENDED] A method as claimed in claim 11, wherein the delay period is of random length.

13. [ORIGINAL] A method as claimed in claim 3, wherein at least one of the performance parameters related to each wireless link is a QOS performance parameter comprising any one or more of a data transmission delay, and a number of dropped frames.

14. [AMENDED] A method as claimed in claim 1, wherein the step of interrupting data transmission over the poorly performing wireless link comprises a step of dropping a data frame transmitted over the poorly performing wireless link.

15. [AMENDED] A method as claimed in claim 14, further comprising a step of re-transmitting the dropped frame after a delay period.

16. [ORIGINAL] A method as claimed in claim 15, wherein the delay period is a period of random length.

17. [ORIGINAL] A method as claimed in claim 13, further comprising maintaining a count of dropped frames.

18. [AMENDED] A method as claimed in claim 17, further comprising a step of dropping the session if the number of dropped frames exceeds a predetermined threshold.

19. [ORIGINAL] A method as claimed in claim 13, wherein the step of monitoring a respective performance parameter respecting each wireless link comprises a step of predicting whether a QOS performance parameter is certain to violate a corresponding QOS requirement of a communications session on the link.

20. [AMENDED] A method as claimed in claim 19, wherein the step of interrupting data transmission over the poorly

performing wireless link comprises a step of preemptively dropping a data frame being transmitted over the poorly performing wireless link.

21. [AMENDED] A wireless data communications network comprising a base station capable of bi-directional data communication with each one of a plurality of wireless terminals over respective bi-directional wireless data communications links, the network comprising:

a) computing means for examining performance of each wireless link of the network to identify a poorly performing wireless link; and

b) control means for temporarily interrupting bi-directional data transmission over the identified poorly performing wireless link.

22. [ORIGINAL] A network as claimed in claim 21, wherein the computing means comprises means for monitoring one or more performance parameters related to each wireless link, and comparing each monitored performance parameter to a respective predetermined tolerance.

23. [ORIGINAL] A network as claimed in claim 22, wherein the one or more performance parameters related to each wireless link are based on any one or more of a quality-of-service (QOS), and interference on the wireless link.

24. [ORIGINAL] A network as claimed in claim 23, wherein at least one of the performance parameters related to each wireless link is based on interference on the link, and comprises any one or more of: a signal-to-noise (S/N) ratio; a carrier-to-interference (C/I) ratio; a

bit-error-rate (BER); a user data throughput rate; and a number of suspended frames.

25. [ORIGINAL] A network as claimed in claim 24, wherein at least one of the performance parameters related to each wireless link comprises an average, taken over a number n of successive bursts, of any one or more of the S/N ratio; the C/I ratio; the user data throughput rate; and the BER.

26. [PREVIOUSLY AMENDED February 4, 2003] A network as claimed in claim 21, wherein the control means is adapted to suspend transmission of a data frame over the poorly performing wireless link.

27. [ORIGINAL] A network as claimed in claim 26, further comprising means for resuming transmission of the data frame after a delay period.

28. [ORIGINAL] A network as claimed in claim 27, wherein the delay period is a period of random length.

29. [PREVIOUSLY AMENDED February 4, 2003] A network as claimed in claim 26, wherein the computing means is further adapted to maintain a count of suspended frames.

30. [ORIGINAL] A network as claimed in claim 29, wherein the control means is adapted to suspend a communications session over the wireless link if the count of suspended frames exceeds a predetermined threshold.

31. [PREVIOUSLY AMENDED November 29, 2001] A network as claimed in claim 30, further comprising means for restarting the session after a delay period.

32. [PREVIOUSLY AMENDED November 29, 2001] A network as claimed in claim 31, wherein the delay period is of random length.

33. [ORIGINAL] A network as claimed in claim 23, wherein at least one of the performance parameters concerning each wireless link is a QOS performance parameter comprising any one or more of a data transmission delay, and a number of dropped frames.

34. [ORIGINAL] A network as claimed in claim 33, wherein the control means is adapted to drop a data frame transmitted over the poorly performing wireless link.

35. [PREVIOUSLY AMENDED February 4, 2003] A network as claimed in claim 34, further comprising means for re-transmitting the dropped frame after a delay period.

36. [ORIGINAL] A network as claimed in claim 35, wherein the delay period is a period of random length.

37. [ORIGINAL] A network as claimed in claim 33, wherein the computing means is adapted to maintain a count of dropped frames.

38. [ORIGINAL] A network as claimed in claim 37, wherein the control means is adapted to drop the session if the count of dropped frames exceeds a predetermined threshold.

39. [ORIGINAL] A network as claimed in claim 33, wherein the computing means is adapted to compute a probability respecting whether the QOS performance parameter is certain to violate a corresponding QOS requirement of a communications session on the link.

40. [ORIGINAL] A network as claimed in claim 39, wherein the control means is adapted to preemptively drop a data frame being transmitted over the poorly performing wireless link.

41. [PREVIOUSLY AMENDED] A base station in a wireless data communications network, the base station being adapted for bi-directional data communications with each one of a plurality of wireless terminals over respective bi-directional wireless communications links, the base station comprising:

a) computing means for examining performance of each wireless link of the network to identify a poorly performing wireless link; and

b) control means for temporarily interrupting bidirectional data transmission over the identified poorly performing wireless link.

42. [ORIGINAL] A base station as claimed in claim 41, wherein the computing means comprises means for monitoring one or more performance parameters related to each wireless link, and comparing each monitored performance parameter to a respective predetermined tolerance.

43. [ORIGINAL] A base station as claimed in claim 42, wherein the one or more performance parameters related to each wireless link are based on any one or more of a quality-of-service (QOS), and interference on the link.

44. [ORIGINAL] A base station as claimed in claim 43, wherein at least one of the performance parameters related to each wireless link is based on interference on the link, and comprises any one or more of: a signal-to-noise (S/N) ratio; a user data throughput rate; a

carrier-to-interference (C/I) ratio; a bit-error-rate (BER); and a number of suspended frames.

45. [ORIGINAL] A base station as claimed in claim 44, wherein at least one of the performance parameters related to each wireless link comprises an average, taken over a number n of successive bursts, of any one or more of the S/N ratio; the C/I ratio; the user data throughput rate; and the BER.

46. [ORIGINAL] A base station as claimed in claim 44, wherein the control means is adapted to suspend transmission of a data frame over the poorly performing wireless link.

47. [PREVIOUSLY AMENDED February 4, 2003] A base station as claimed in claim 46, wherein the computing means is further adapted to maintain a count of a number of suspended frames.

48. [ORIGINAL] A base station as claimed in claim 47, wherein the control means is adapted to suspend a communications session over the link if the count of suspended frames exceeds a predetermined threshold.

49. [ORIGINAL] A base station as claimed in claim 43, wherein at least one of the performance parameters related to each wireless link is a QOS performance parameter comprising any one or more of a data transmission delay, and a number of dropped frames.

50. [ORIGINAL] A base station as claimed in claim 49, wherein the control means is adapted to drop a data frame transmitted over the poorly performing wireless link.

51. [PREVIOUSLY AMENDED] A base station as claimed in claim 50, wherein the computing means is adapted to maintain a count of dropped frames.

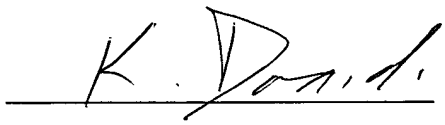
52. [ORIGINAL] A base station as claimed in claim 51, wherein the control means is adapted to drop the session if the count of dropped frames exceeds a predetermined threshold.

53. [ORIGINAL] A base station as claimed in claim 49, wherein the computing means is adapted to compute a probability respecting whether the QOS performance parameter is certain to violate a corresponding QOS requirement of a communications session on the wireless link.

54. [ORIGINAL] A base station as claimed in claim 53, wherein the control means is adapted to preemptively drop a data frame being transmitted over the poorly performing wireless link.

If any extension of time under 37 C.F.R. § 1,136 is required to obtain entry of this response, such extension is hereby respectfully requested. If there are any fees due under 37 C.F.R. §§ 1.16 or 1.17 which are not enclosed herewith, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our Deposit Account No. 19-5113.

Respectfully submitted,



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